

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference K 39 604/1am	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA416)	
International application No. PCT/EP 03/1 1094	International filing date (<i>day/month/year</i>) 07.10.2003	Priority date (<i>day/month/year</i>) 09.10.2002
International Patent Classification (IPC) or both national classification and IPC C08L23/02		
Applicant BOREALIS TECHNOLOGY OY		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 2 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 22.04.2004	Date of completion of this report 20.01.2005	
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016 </div> </div>	Authorized Officer Schmidt, H Telephone No. +31 70 340-2461	



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/11094**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-15 as originally filed

Claims, Numbers

1-13 received on 23.12.2004 with letter of 23.12.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/1 1094

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-6,8-10,12-13
Inventive step (IS)	Yes: Claims	
	No: Claims	1-14
Industrial applicability (IA)	Yes: Claims	1-14
	No: Claims	

2. Citations and explanations

see separate sheet

Box I

1. The following documents (D1-D3) are referred to in this opinion; the numbering will be adhered to in the rest of the procedure:

D1 EP-A-1186619
D2 US-A-4373051
D3 EP-A-1219678

Box V

2. Upon considering novelty and inventivity of the present claims, it has to be taken into consideration that some of the terms of present claim 1 are not clear acc. Art. 6 PCT

2.1 The term "nanofiller" in claim 1 is unclear. It does not define a clear range for the particle size of the filler.

2.2 There is no evidence in the application that all olefin copolymers with polar monomers directly polymerized by single site catalyst achieve the same technical effects as copolymers of undecene-1-ol according the examples. On the other hand, there is no proof that copolymers of olefins and polar monomers prepared otherwise do not solve the same technical problem. As long as such evidence is not provided, the extent of protection of the claim is unclear (Art. 6 PCT). It is considered as an undue burden of experimentation for a skilled man to find out all possible combinations of olefin copolymers with functional groups, and optional matrix polymers solving the technical problem posed in present application.

3. The subject-matter of claims 1-6, 8-10, 12-13 is not new in the sense of Article 33(2) PCT.

3.1 Since the term "nanofiller" is not clearly defined in present claim 1, the subject matter of the claim reads:

a composition of a clay based-layered material and a polyolefin with functional groups (considered to be a copolymer, not a graft polymer)

3.2 D1 is directed to polar group containing olefin polymers. Section [0480] of D1 describes nanofiller material for this material (see also section [0525-0530] of D1).

Example 1 of D1 discloses the copolymers used in present examples. D1 hence is considered novelty destroying for present claims 1-6, 8-10 and 12-13

3.3 D2 describes pre-blending of fillers of particle size 0.07 micron with ethylene vinyl acetate polymer to improve the impact strength of the matrix polymer PVC. Clay based layered material is not disclosed

4. Present claims 1-13 lack an inventive step acc. Art. 33(3) PCT

4.1 Closest prior art for the consideration of inventive step would be D1. Differences to D1 are present in the subject matter of claims 7 and 11. However, it is at present not clear which specific technical problem is to be solved in a non-obvious way by the subject matter of these claims. Since the applicant did not provide evidence for a technical effect of the subject matter of these claims, the problem to be solved is to provide an alternative composition. The solutions presented in the claims indicated above are regarded to be obvious and non-inventive, since they are all known from D3 and directly applicable on D1

JC13 Rec'd PCT/PTO 12 APR 2005

Claims

1. A polymer composition comprising
 - (A) optionally a matrix polymer,
 - (B) a nanofiller ~~and~~ *which is a clay-based layered material*
 - (C) a polyolefin with functional groups which has been prepared directly by polymerising olefin monomers with comonomers comprising functional groups using a single site catalyst.
2. A polymer composition according to claim 1, wherein the fraction of the comonomers with functional groups in polyolefin (C) is from 0.05 to 10 mol%, preferably from 0.1 to 5 mol% and still more preferred from 0.1 to 2 mol%.
3. A polymer composition according claims 1 or 2, wherein polyolefin (C) is a polyolefin with polar groups.
4. A polymer composition according to claim 3, wherein the polar comonomers used in the preparation of polyolefin (C) are monomers comprising a carbon-carbon double bond and an organic alcohol or acid group.
5. A polymer composition according to claim 4, wherein said comonomers comprise from 6 to 18 carbon atoms, and more preferably from 8 to 16 carbon atoms.
6. A polymer composition according to any of the preceding claims, wherein polyolefin (C) is a copolymer comprising ethylene and/or propylene monomers and comonomers with functional groups.

~~7. A polymer composition according to any of the preceding claims, wherein nanofiller (B) is a clay-based layered material.~~

7. ~~8.~~ A polymer composition according to claim ~~7~~¹ wherein nanofiller (B) has been intercalated with a quaternary ammonium compound containing intercalating agent.

8. ~~9.~~ A polymer composition according to any of the preceding claims, wherein matrix polymer (A) is a polyolefin.

9. ~~10.~~ A polymer composition according to claim ~~9~~⁸, wherein matrix polymer (A) is an ethylene or propylene homo- or copolymer.

10. ~~11.~~ A polymer composition according to any of the preceding claims, wherein polyolefin (C) is present in an amount of 1 to 100, preferably of 5 to 50 and still more preferred of 4 to 10 parts by weight per 100 parts by weight of the total composition.

11. ~~12.~~ A polymer composition according to any of the preceding claims, wherein nanofiller (B) is present in an amount of 1 to 15, preferably of 2 to 10 and still more preferred of 4 to 10 parts by weight per 100 parts by weight of the total composition.

12. ~~13.~~ A polymer composition according to any of the preceding claims, wherein the matrix polymer (A) is present in amount of from 0 to 98, preferably from 40 to 93 and still more preferred from 45 to 91 parts by weight per 100 parts by weight of the total composition.

13. ~~14.~~ Use of a polyolefin with functional groups which has been prepared by polymerising olefin monomers with comonomers comprising functional groups using a single site catalyst as a compatibiliser in a polymer composition comprising a matrix polymer and a nanofiller~~x~~ which is a clay-based layered material.